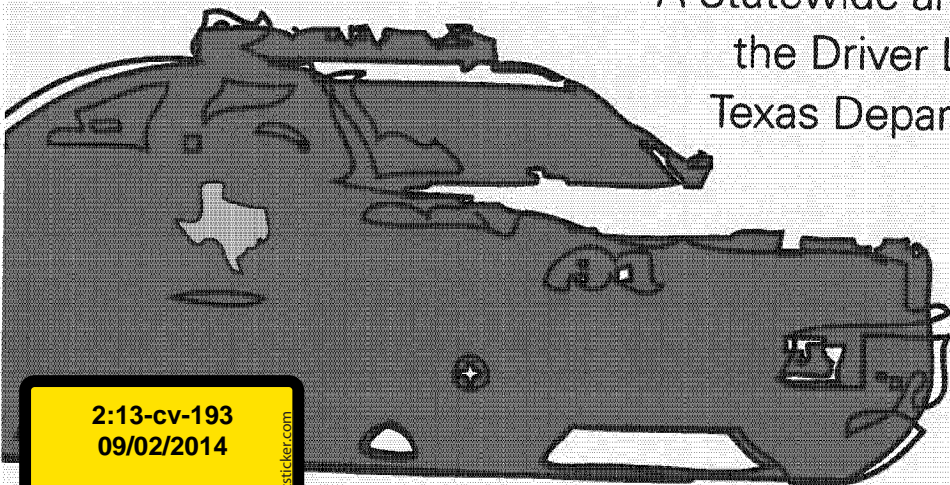


2011

BUSINESS INTELLIGENCE ANALYSIS REPORT

A Statewide and Regional Analysis of
the Driver License Division of the
Texas Department of Public Safety



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1

Introduction & Purpose

Beginning in January 2011, the Government Partnerships Program (GPP) at Texas State University-San Marcos (TxState), funded by an interagency contract with the Texas Department of Public Safety (TxDPS) Driver License Division (DLD), conducted a statewide and regional Business Intelligence Analysis to improve the customer experience at driver license offices (DLO) and efficiently utilize TxDPS resources.

This report provides a detailed view of 2010 statewide and regional transaction and demographic data in the context of understanding the relationship between TxDPS DLD services and customers. It also outlines the methods and results of analyses, and provides recommendations for office staffing and new office locations.

BACKGROUND

TxDPS has been providing service to the Texas population since 1935 (Texas Department of Public Safety 2011a). TxDPS divides the state into six regions. The DLD further divides three of the six regions into two sub-regions each for a total of nine DLD Regions. DLD Regions 1A and 1B, in Northeast Texas, include Dallas and Fort Worth, respectively. DLD Regions 2A and 2B are in Southeast Texas and divide Houston into two parts. DLD Region 3 extends through South Texas and the Rio Grande Valley. DLD Region 4 contains El Paso and West Texas. Northwest Texas and the Texas Panhandle are contained in DLD Region 5.

DLD Regions 6A and 6B, in Central Texas, include San Antonio and Austin, respectively (Figure 1).

Previously, Texas had 306 Driver License Offices (DLOs). After DLO closures due to equipment failures, Texas is currently served by 226 DLOs. DLOs are classified into four office sizes based on the number of full-time equivalencies (FTEs) at each office. The four sizes are:

- Small (0-3 FTEs)
- Medium (4-9 FTEs)
- Large (10-24 FTEs)
- Mega (25+ FTEs)

With a current population of approximately 25 million people and a 20.6% population increase in the decade from 2000 to 2010, Texas has one of the largest and fastest growing populations in the country (United States Census Bureau 2011b). Although population has increased and its distribu-

tion has changed, the resources available for TxDPS to provide service to the population have not increased. This has caused and will continue to cause strain on the DLD's resources (Texas Department of Public Safety 2011b). The population growth in Texas has not occurred uniformly across the state. Counties in and around major urban centers such as Houston, Dallas-Fort Worth (DFW), Austin, and San Antonio have been increasing in population while counties in parts of West Texas and the Texas Panhandle are experiencing population losses (United States Census Bureau 2011b).

Although the population distribution and demographic composition of Texas have changed in recent decades, the DLD's staffing levels, office locations, and business practices have remained relatively unchanged.

In July 2009, the Texas Sunset Advisory Commission, created to identify and eliminate waste, duplication, and inefficiency in government agencies (Texas Sunset Advisory Commission 2011), released an assessment report of TxDPS. They concluded that TxDPS "operates under a basic management and organizational structure that has not

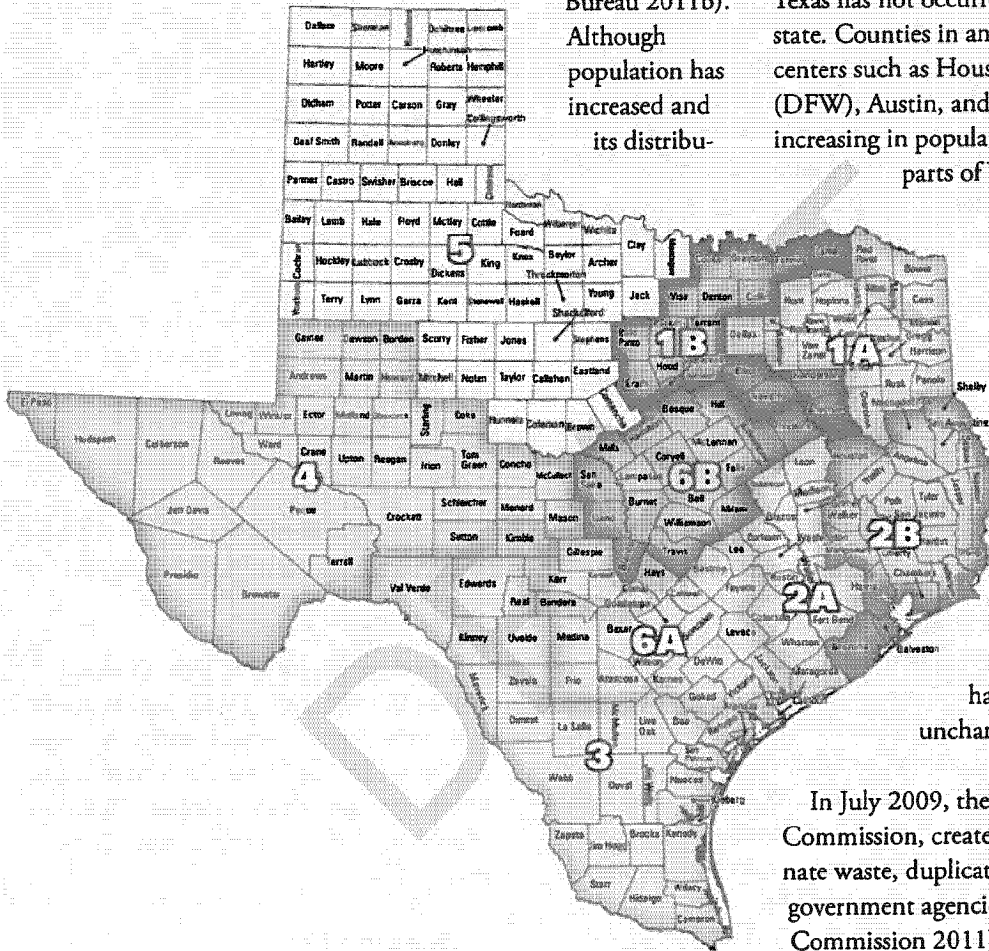


Figure 1. Texas Department of Public Safety Driver License Division Regions.

changed significantly in many years” (Isett et al. 2009). One of the key recommendations was that TxDPS “should operate the Driver License program using a civilian business management model” (Isett et al. 2009).

PURPOSE

The two main objectives of the Business Intelligence Analysis were to:

- 1 Optimize the relationship of customers to driver license facilities by equalizing service opportunity at all office locations

within the state of Texas while minimizing costs to the state and disruption to customers and employees.

- 2 Provide decision-makers with necessary data to improve understanding of decisions and their potential impacts.

The analysis examined TxDPS Driver License System (DLS) transaction and demographic data from calendar year (CY) 2010 to improve TxDPS understanding of customer demand and to achieve the main objectives of the Business Intelligence Analysis project.

2

Methods

Descriptions of all software, data, and methods employed to complete Workload Snapshots, understand customer demand, provide DLO recommendations including potential Mega DLO locations and DLO closures are detailed in this section. All methods were the best known procedures at the time of the analyses. Quality control measures were implemented and completed throughout the course of analyses for the validation of results.

SOFTWARE

Four primary software products were used during the analysis process.

- 1 Environmental Systems Research Institute's (ESRI) ArcGIS 10 is Geographic Information Systems (GIS) software that organizes, displays, and analyzes data spatially. ArcGIS was used throughout the project for geographic analyses.
- 2 ESRI's Business Analyst Desktop 10, or as it will be referred to in this report Business Analyst, functions as an add-on to ArcGIS. It combines GIS analysis and visualization capabilities with a data package containing demographic and business data. Business Analyst incorporates company or agency-specific data to aid in making accurate decisions about a specific company or agency (ESRI 2011). TxDPS and Business Analyst data were input into multiple models to analyze customer demand and TxDPS services.
- 3 Statistical Package for the Social Sciences (SPSS) is software used for data mining and statistical analysis. SPSS was used to manage and analyze DLS transaction data.
- 4 Microsoft Excel was used for data organization and calculations.

DATA VALIDATION AND PREPARATION

DATA

The DLS data were provided by TxDPS on January 5, 2011 and included driver license (DL) and identification (ID) transactions from April 15, 2009 to January 3, 2011. The DLS data provided included DL and ID transactions originating in the DLS as well as transactions batch processed into the DLS from the older DDL system. The DLS was progressively implemented across the state beginning in April 2009. The implementation of the DLS was important because DLOs not using the DLS were unable to track start and end times for transactions.

The DLS data will be referred to throughout this report as the Original DLS Dataset.

TxDPS also provided detailed DLO information in a document called the DLD Sites Spreadsheet (e.g. DLO lease expiration dates, existing FTEs, DLO hours, DLO type/size). Ongoing DLO closure information and existing office FTE carrying capacities (the maximum number of FTEs that could be allocated to an office) were also provided.

DATA VALIDATION

To begin data validation, the Original DLS Dataset was imported into SPSS. Using a

data dictionary provided by TxDPS, data variables were assessed for accuracy and usefulness. The character length and data type were verified against the data dictionary. Additional validation included analysis of logical relationships between variables and consistency. For example, a transaction completed using the Internet should not have had a site code, or DLO location, associated with it. Spelling consistency was examined on string variables such as City, County, and Country of Origin. A uniqueness check was conducted on the Event Identification Number to ensure all transactions had a unique identifier. All inconsistencies and data issues were reconciled by the GPP with TxDPS.

TRANSACTION DATASETS

After data validations were completed, three datasets were created from the Original DLS Dataset: the Volume Dataset; the Field Usage Dataset; and the Field Processing Time Dataset. All datasets were created and analyses conducted using transactions from CY 2010. Only transactions from CY 2010 were used because most DLOs were not using the DLS in CY 2009. In addition, the use of one full year of data (available only for CY 2010) allowed for temporal analysis of transactions (i.e. monthly analysis). Every transaction in the DLS data was considered an initiated transaction. Initiated transactions had one of three statuses: In Progress, Cancelled, or Completed.

VOLUME DATASET

All transactions were initiated by customers through one of five Request Methods: Field (in a DLO), Texas Online Web (TOL WEB), Mail, Texas Online Interactive Voice Recognition (TOL IVR), or Other. Request Method Other refers to any transaction not requested using one of the four primary Request Methods. Initiated transactions with the Request Method Other were removed from the Volume Dataset under the direction of TxDPS because they did not reflect typical DLD transaction requests. There were only 413 transactions with Request Method Other in the CY 2010 DLS data. The Volume Dataset was used to calculate Request Method volume which is the number of initiated transactions per Request Method. The Volume Dataset had 5,816,158 initiated transaction records.

FIELD TRANSACTION DATASETS

Two Field Transaction Datasets with initiated transactions from Field offices were created from the Volume Dataset: The Field Usage Dataset and the Field Processing Time Dataset. Field offices will be referred to as DLOs throughout this report. It was necessary to create two Field Transaction Datasets because only completed transactions had completion times. Completion times were necessary for all transaction processing time analyses. Therefore, the Field Usage Dataset was created for all analyses not requiring transaction

processing times and the Field Processing Time Dataset was created for all processing time analyses. Specific DLOs and all of their transactions were removed from the two Field Transaction Datasets. Cooper, Emory, Elgin, Giddings, Lockhart, George West, Refugio, and Tilden DLOs had no DLS rollout dates in the DLD Sites Spreadsheet. However, the DLS data contained transactions for these DLOs with valid time stamps. These transactions were not batch processed by the DDL system. The transaction data for these DLOs were inconsistent with the official DLS roll out schedule. As a result, these transactions were removed from the two Field Transaction Datasets. The Pittsburg DLO transaction data covered only five days in CY 2010. DLS was never officially rolled out and the office was closed in June 2010. These transactions were removed. Kary transactions were removed because the office was not open during 2010 and had an unknown closure date. Transactions from Headquarters in Austin were also removed because the office was atypical and did not reflect operations of a standard DLO (Table 1).

FIELD USAGE DATASET

The Field Usage Dataset included initiated transactions with the Request Method Field and a valid site code. Site codes are numbers assigned to DLOs. 9,546 initiated transactions without a valid site code were excluded. Note: Mobile Offices that used the DDL system were aggregated using site codes 690

Table 1. DLOs with excluded transactions in the Field Usage and Field Processing Time datasets.

DLOs with Excluded Transactions	Number of Total Transactions in Dataset	Percentage of Total Transactions in Dataset
Cooper, Emory*	183	0.0038%
Pittsburg	27	0.00057%
George West, Refugio, and Tilden*	409	0.0086%
Elgin, Giddings, and Lockhart*	643	0.014%
Kary	4,135	0.087%
Headquarters	3,301	0.069%

**Transaction data for DLOs were grouped in the DLS data.*

and 691 and were analyzed together. Mobile Offices are offices without secure, permanent locations that require equipment to be transported to the site and set-up prior to beginning service for the day. Every Mobile DLO has a Home Base DLO from which an FTE travels to operate the Mobile DLO.

The Field Usage Dataset was used to calculate Workload Snapshots, transaction volume by operational hour and employee hour, and additional geographic analyses for DLOs. The Field Usage Dataset had 4,736,009 useable initiated transaction records.

FIELD PROCESSING TIME DATASET

The Field Processing Time Dataset was extracted from the Field Usage Dataset and included only transactions with transaction status Complete (not Cancelled or In Progress). All transactions included in the

dataset had identical start and end dates and transaction processing times greater than zero seconds. Combination transactions were removed from the Field Processing Time Dataset because their transaction processing times were inconsistent and could not be compared among other transaction types. A Combination transaction is a transaction initiated for a customer with a DL and an ID. A change common to both cards, such as an address change, affects both cards and results in two transactions that are combined in the DLS.

To remove statistical outliers in the Field Processing Time Dataset, transaction processing time was analyzed by transaction type. Transaction types included in the DLS data were Duplicate ID, Duplicate DL, Original ID, Original DL, Renewal ID, Renewal DL, Modify DL, Deferred Test, and Comprehensive Test. If the transaction processing time,

the time elapsed between the initiation and completion of a transaction, was outside the range of three standard deviations from the average processing time of its transaction type, the transaction was removed from the dataset. Deferred Test and Comprehensive Test transaction types were removed because of the limited volume of these transactions and because the components of the two tests varied across drivers. As a result of this variation, it was not possible to create a desired or standard processing time for Deferred and Comprehensive Tests. The Field Processing Time Dataset was used for all calculations involving transaction processing time. The Field Processing Time Dataset had 3,559,407 completed transaction records.

ANALYSES

Analyses were conducted in five phases.

- 1 Phase One was an exploration of transaction data and DLO information provided by TxDPS. Exploration included Workload Snapshots and transaction volume and processing time calculations.
- 2 Phase Two analyzed customer demand by modeling statewide potential demand and regional FTE reallocations.
- 3 Phase Three determined potential Mega DLO locations and statewide DLO staffing recommendations.

- 4 Phase Four examined potential DLO closures.
- 5 Phase Five was a combination of multiple additional analyses including: transactions initiated by 15- to 19-year-olds, offices with late-day closures, Internet transactions and connectivity, driver education, and model and risk employees.

PHASE ONE: DATA AND STATISTICS

WORKLOAD SNAPSHOTS

Statewide and regional workload snapshots were statistics generated to understand transaction volume. Statewide and regional workload snapshots are initiated transaction volume calculations by day, week, month, and year. The DLS data included descriptors that were used to further classify transactions. Transaction volumes were calculated using the descriptors: Correction No Fee, Temporary Visitor, and Out-of-State Transfer (Table 2). A Correction No Fee descriptor indicated that a transaction was initiated to correct a DL/ID photo or signature that did not pass quality assurance standards. The customer is not charged for the Correction No Fee transaction. A transaction with a Temporary Visitor descriptor indicated that a DL/ID transaction was initiated for a customer that was not a U.S. citizen or lawful permanent resident, a Temporary Visitor.

Table 2. Analysis level for descriptive statistics and workload snapshots.

Statistics	Analysis Level
Request Method Frequency	Statewide and Regional
Initiated Transaction Status	Statewide and Regional
Correction No Fee	Statewide and Regional
Temporary Visitor as Percent of Total State Transactions	Statewide and Regional
Out of State Transfers	Statewide and Regional
Initiated Transaction Type Frequency	Statewide and Regional
Initiated Transactions by Month (workload snapshot)	Statewide and Regional
Initiated Transaction Types by Month (workload snapshot)	Statewide and Regional
Initiated Transactions by Day (workload snapshot)	Statewide and Regional
Initiated Transaction Type by Hour (workload snapshot)	Statewide
Completed Transaction Processing Times	Statewide
Temporary Visitor as Percent of Total Monthly Transactions	Statewide
Transactions by Driver License Office	Individual DLOs

The transactions require valid documentation that confirms temporary admission to the United States. A transaction with an Out-of-State Transfer descriptor indicated an ID/DL transaction that was initiated by a customer with a valid ID/DL from another U.S. state.

24,764 (.5%) of DLO initiated transactions did not have a region code and were removed from all DLD Region workload snapshot analyses.

Command syntax is the language, or code, behind statistical operations in SPSS. It was created and saved for SPSS workload snapshot calculations to ensure the reproducibility of analyses, stream-line repetitive tasks, handle complex data manipulations and analyses, and provide documentation of

methodology for quality control and validation.

USAGE AND PROCESSING FACTORS

DLO and FTE Usage Factors were calculated statewide, by region, site code, office size, and office type. DLO Usage Factors were calculated using total hours open in CY 2010 (Operational Hours) and initiated transaction volumes. FTE Usage Factors were calculated using the total number of hours worked by FTEs at a DLO (Employee Hours) and initiated transaction volume.

DLO and FTE Processing Factors were also calculated statewide, by region, site code, office size, and office type. DLO Processing Factors were calculated using Operational

Hours and total transaction processing time. FTE Usage Factors were calculated using Employee Hours and total transaction processing time.

OPERATIONAL AND EMPLOYEE HOUR CALCULATIONS

Operational Hours

Operational Hours were calculated from hours of operation in the DLD Field Directory provided to the GPP from TxDPS.

Operational Hours = (hrs open per day*) x (number days open per year)

**Accounts for days with late closures and part-time schedules.*

Employee Hours

Employee Hours were calculated using the total number of assigned FTEs, total number of FTEs shared between offices (Mobile Offices and Home Bases), and the total possible Employee Hours in 2010. If a DLO closed in 2010, only open days were used in the calculation of total possible Employee Hours. Vacation time and sick leave were not considered because the data were not available.

Total possible Employee Hrs in 2010 for an FTE:
(251 work days (excludes holidays)) x (8 hrs/day)
= 2008 hrs

Employee Hours for Full-time Offices:

The Employee Hours for offices open full-time (Operational Hours greater than or equal to 2008 hours per year) were calculated by multiplying assigned FTEs by 2008 hours. This assumes that no FTEs worked overtime.

Example:

10 FTEs x 2008 hrs = 20,080 Employee Hrs

Employee Hours for Part-time Offices:

The Employee Hours for offices open part-time (less than 2008 hours per year) were calculated by multiplying assigned FTEs by the Operational Hours.

Example:

2 FTEs x 1000 Operational Hrs = 2000 total Employee Hrs

Employee Hours for Mobile and Part-time Offices (Offices with no assigned FTE):

The Employee Hours for offices with no assigned FTEs (primarily Mobile Offices) were calculated by multiplying the number of FTEs sent from the Home Base DLO by the Operational Hours of the Mobile or Part-time DLO. These hours were subtracted from the Mobile or Part-time DLO's Home Base Employee Hours when the Home Base's Operational Hours were 2008 or more. If the Home Base's Operational Hours were less than 2008, the hours were not subtracted. These calculations account for two scenarios: